

**Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, DC 20554**

In the Matter of)	
)	
Expanding the Economic and Innovation Opportunities of Spectrum Through Incentive Auctions)	Docket No. 12-268
)	
)	
Revisions to Rules Authorizing the Operation of Low Power Auxiliary Stations in the 698-806 MHz Band)	WT Docket No. 08-166
)	
)	
Public Interest Spectrum Coalition, Petition for Rulemaking Regarding Low Power Auxiliary Stations, Including Wireless Microphones, and the Digital Television Transition)	WT Docket No. 08-167
)	
)	
Amendment of Parts 15, 74 and 90 of the Commission's Rules Regarding Low Power Auxiliary Stations, Including Wireless Microphones)	ET Docket No. 10-24
)	

**COMMENTS OF THE SOCIETY OF BROADCAST ENGINEERS,
INCORPORATED**

The Society of Broadcast Engineers, Incorporated (“SBE”)¹ respectfully submits these Comments² in response to (1) the Commission’s *Notice of Proposed Rulemaking* in the above-captioned Docket 12-268 proceeding addressing incentive auctions in the television broadcast band;³ and (2) the Commission’s November 2, 2012 Public Notice⁴ seeking comments in order

¹ SBE is the national association of broadcast engineers and technical communications professionals, with more than 5,000 members worldwide.

² The Commission has twice extended the comment date in both open proceedings above. These comments are therefore timely filed. See, the *Order*, DA 12-1926 (rel. November 30, 2012, and the *Order*, DA 12-1916 (rel. November 29, 2012) and prior orders cited therein.

³ See *Expanding the Economic and Innovation Opportunities of Spectrum Through Incentive Auctions*, Notice of Proposed Rulemaking, GN Docket No. 12-268 (rel. Oct. 2, 2012) (“*Incentive Auctions NPRM*”).

⁴ See FCC Public Notice, *The Wireless Microphones Proceeding, Comment Deadlines Established*, DA 12-1763 (rel. Nov. 2, 2012). See also 77 Fed. Reg. 64446 (Oct. 22, 2012) (“Public Notice”).

to refresh the record with respect to the operation of wireless microphones and Low Power Auxiliary Service facilities (LPAS) in the television broadcast band. For the reasons set forth herein, SBE principally requests that the Commission not retreat from the accommodations made for continued operation of wireless microphones (WMs) and LPAS systems in the television broadcast band very recently in the Commission's White Spaces proceeding.⁵ Instead, in the best interests of the public, which relies heavily on the ability of broadcasters and video production companies to provide audio and video coverage of major news, sports and other events in real time, the Commission must protect ongoing WM and LPAS operation and provide a reasonable period of time for transition to narrowband WM and LPAS facilities. To do otherwise will substantially disrupt the beneficial broadcast services to the public as they are now being provided and upon which the viewing public relies. For its comments in the proceedings captioned above, SBE states as follows:

I. Introduction.

1. In the *Incentive Auctions NPRM*, the Commission recognized that the proposal to auction and repack the UHF TV bands may reduce the spectrum available in the TV bands for secondary use by licensed and unlicensed wireless microphones and LPAS systems. The auction and repacking process will as well reduce the spectrum available for unlicensed white space devices.⁶ In that proceeding, the Commission seeks comment on, among other things, a number of issues aimed at promoting the efficient and effective operation of wireless microphones in the TV broadcast spectrum, thus to facilitate the auction of spectrum for broadband purposes in the

⁵ *Unlicensed Operation in the TV Broadcast Bands*, ET Docket No. 04-186, *Additional Spectrum for Unlicensed Devices Below 900 MHz and in the 3 GHz Band*, ET Docket No. 02-380, Second Memorandum Opinion and Order, 25 FCC Rcd 18661 (2010) (the White Spaces Docket). *See also Unlicensed Operation in the TV Broadcast Bands*, ET Docket No. 04-186, Third Memorandum Opinion and Order, 27 FCC Rcd 3692 (2012).

⁶ *Incentive Auctions NPRM*, at ¶¶ 221-239.

band 470-698 MHz.⁷ Correspondingly, the Public Notice seeks to “refresh the record” on two primary topics related to wireless microphones: (1) whether license eligibility should be expanded for certain categories of Part 74 wireless microphone users; and (2) what steps the Commission should take to promote more efficient use of spectrum by wireless microphones. There are numerous aspects of these two proceedings (with respect to WMs and LPAS systems) that are interrelated. In the Public Notice, the Commission states: “We ask that these comments take into consideration recent industry developments, including advances in wireless microphone technologies, *as well as related Commission proceedings that affect use of wireless microphones, including the TV White Spaces proceeding and the Incentive Auctions proceeding proposing auction of spectrum currently allocated to television broadcasting.*”⁸ In the *Incentive Auctions NPRM*, the Commission noted that it intended to issue a public notice to refresh the record on expanding eligibility for licensed operations to specified classes of users, and on improved efficiency standards.⁹ The Public Notice was then issued raising both of those issues.

II. Background.

2. The timing of the release of the Public Notice and the *Incentive Auctions NPRM* have created substantial difficulties for broadcasters, and especially for broadcast engineers, who are typically involved in the technical arrangements for electronic news gathering (ENG) and for video production of sporting and other entertainment events. The proposals in the instant proceedings come on the heels of a series of recent Commission actions which have heretofore, alone and cumulatively, had an exceptionally significant adverse effect on the availability of

⁷ *Incentive Auctions NPRM*, at ¶¶ 215-26.

⁸ Public Notice, at 64,446-47 (emphasis added).

⁹ See *Incentive Auctions NPRM*, ¶ 224 n.354.

spectrum for wireless microphones, low power auxiliary service devices, and wireless intercom systems. Without any practical opportunity thus far to adapt to those changes, the Commission has now changed the plan for wireless microphones entirely, and in the process has eliminated all certainty about the ability to conduct broadcast, cablecast or satellite broadcasts of urgent news, and sports and entertainment programming due to a completely inadequate amount of spectrum for these devices.

3. On January 14, 2010, the Commission adopted a *Report and Order and Further Notice of Proposed Rule Making (Wireless Microphone R&O/FNPRM)* addressing the rules for wireless microphones and other low power auxiliary devices that operate in the TV bands.¹⁰ In that proceeding, the Commission prohibited the manufacture, import, sale, lease, offer for sale or lease, or shipment of wireless microphones and other low power auxiliary stations intended for use in the 700 MHz Band (TV channels 52-69, 698-806 MHz) in the United States. It was required that all LPAS facilities, including WMs¹¹ cease operations in the 700 MHz band no later than June 12, 2010. The Commission acknowledged that WMs are used for important functions, and noted that many WMs were being operated by (non-broadcast) entities and persons ineligible for a Part 74 license. Therefore, along with the migration of full-power TV stations, Class A TV stations, TV translators, TV boosters and Low-power TV stations to available channels below 698 MHz (the “core TV channels”), LPAS’ and WMs had to migrate downward as well.”¹² This greatly reduced the number of channels available for WM and LPAS operation, and the downward migration was completed less than three years ago. A very large number of WMs were operating in the 700 MHz band and that equipment had to be modified or replaced with

¹⁰ See *Report and Order and Further Notice of Proposed Rule Making* in WT Docket Nos. 08-166 and 08-167 and ET Docket No. 10-24, 25 FCC Rcd 643 (2010).

¹¹ Low power auxiliary stations are short-path transmit devices. They are, in addition to wireless microphones and wireless intercoms, used for purposes such as cue and control communications, and synchronization of TV camera signals. 47 C.F.R. § 74.801 *et seq.*

¹² TV channels 2-51, excluding channel 37.

equipment that was not capable of operation above 698 MHz.

4. Meanwhile, at the low end of the UHF TV band, channels 14-20 (470-512 MHz) are used in thirteen major markets in the United States for important land mobile radio communications. That band is fully deployed for that purpose in those markets. There is a plethora of additional uses made of the television broadcast band. As noted in the *Second Memorandum Opinion and Order* in the White Spaces Docket at ¶ 8:

In addition, medical telemetry equipment is permitted to operate on an unlicensed basis on any vacant TV channel in the range of channels 7-46, and unlicensed remote control devices are allowed to operate on any TV channel above 70 MHz (*i.e.*, above channel 4), except for channel 37. TV channel 37 (608-614 MHz) is allocated for radio astronomy and the wireless medical telemetry service (WMTS) and is not used for TV broadcasting. The Offshore Radiotelephone Service uses channels 15-17 in certain regions along the Gulf of Mexico...

(footnotes omitted)

The compression of all of these uses into the band 512-698 MHz, plus the Commission's recent addition of TV White Spaces Devices (TVBDs) to the mix and the accommodation (essentially legalization) of unlicensed WM users in that same spectrum has made the frequency coordination of WMs and LPAS' exceptionally difficult, despite real-time channel sharing procedures developed and utilized by SBE frequency coordinators in order to maximize spectrum efficiency. The concept of "TV White Spaces", long a misnomer (because there never really were any) became, after the 2010 White Spaces proceeding, a most inapplicable label indeed.

5. Yet, the Commission did, as recently as September of 2010, provide at least some protection for WMs and LPAS. In the *Second Memorandum Opinion and Order* in the White Spaces Docket, at ¶ 29, the Commission stated that it "continue[s] to recognize that wireless microphones are currently used in many different venues where people gather for events large and small and many consumers and businesses have come to rely on these devices." Specifically

for the purpose of accommodating WMs after the reallocation of the 700 MHz band, the Commission noted that it had previously limited use of TV channels 2 and 5-20 to communications between fixed TVBDs, and it had also previously reserved two channels in the range 14-51 in the 13 markets where PLMRS and CMRS systems operate “to make sure that frequencies are available for wireless microphones.”¹³ Most importantly, the Commission held in September of 2010 that it was “...expanding the reservation of two channels in the range 14-51 to all markets nationwide as suggested by several petitioners. This will provide frequencies where a limited but substantial number of wireless microphones can be operated on any basis without the potential for interference from TV bands devices. It will also ensure that frequencies are available everywhere for licensed wireless microphones used on a roving basis to operate without risk of receiving harmful interference from TVBDs.”¹⁴ The Commission also provided for a nominal separation distance between TVBDs and sites of venues and events where large numbers of unlicensed wireless microphones are used by permitting such sites to be registered in the TV bands databases. It noted that, at any particular location, a number of TV channels would not be available for TVBDs due to the application of the various interference protection requirements under the rules. Therefore, the Commission concluded, “a significant amount of spectrum will be available on which wireless microphones can be operated as they have in the past without concern for interference from TVBDs. We believe that this spectrum will provide sufficient frequencies to support wireless microphone operations at the great majority of events.” Because of these accommodations, and specifically because of the reservation of the two

¹³ See *Second Report and Order*, 23 FCC Rcd 16860 (2009) at ¶ 151. With regard to channels 2 and 5-20, the Commission stated that restricting use of channels 2 and 5-20 to communications by fixed devices with other fixed devices would limit the number of TVBDs that could potentially conflict with wireless microphone use.

¹⁴ *Second Memorandum Opinion and Order*, 25 FCC Rcd 18661 at 18674 (2010).

channels per market for WM and LPAS operation,¹⁵ broadcasters and video production companies were confident that they could continue to conduct ENG and event production activities as necessary (albeit with increased reliance on local frequency coordination and real-time channel sharing). Broadcasters have since late 2010 invested heavily in wireless microphones that will operate near TV channel 37 because of the location of the reserved channels specified by the Commission.

6. The Commission's accommodation for WMs in the TV White Spaces Docket was certainly no panacea. As the Commission has acknowledged,¹⁶ there is at any given news or entertainment event the need for more than 100 WMs and LPAS devices.¹⁷ Because, in a given broadcast market there are many unlicensed WMs as well as licensed WMs, and because the

¹⁵ See, 47 C.F.R. §15.707(a) (prohibiting white space devices on the first channel above and the first channel below channel 37 that are available, or if a channel is not available above and below channel 37, prohibiting white space devices on the first two channels nearest to channel 37).

¹⁶ A good primer on WM and LPAS use of UHF television broadcast bands was provided at paragraph 223 of the *Incentive Auctions NPRM*. The Commission stated that:

licensed LPAS may operate on vacant channels allocated to television broadcasting. In the UHF band, co-channel LPAS operations must be separated by a distance of at least 113 kilometers (70 miles) from the television station. Unlicensed wireless microphones are permitted similar types of operations on this unused spectrum. Wireless microphones operate in a relatively narrow bandwidth and often are technically capable of choosing different frequencies among multiple vacant channels available for operation. Many wireless microphones are used regularly and predictably (*e.g.*, at television studios, movie studio lots, or major sporting events facilities), but at times the location of their operation changes (*e.g.*, covering news events in different places. The nature of wireless microphones and their use is such that they operate for relatively short intervals at different times, and the specific frequencies they use for operation often change, even when used at one location. Theatrical and sports productions and other major events often use more than 100 wireless microphones, which in certain locations could use most if not all of the UHF channels available to them in the television bands.

¹⁷ At the largest sporting events and at political conventions, there are typically more than 120 WMs and LPAS devices in use, often simultaneously. For example, at a recent Formula One automobile race in Texas, held at a venue well away from the metropolitan area of Austin, Texas, there was an acute shortage of WM spectrum and well over 120 WMs were in use at any given time, due to the presence of non-U.S. broadcasters as well as local broadcast and video production entities. At the NFL Super Bowl each year, and during political conventions, extraordinary efforts are made to accommodate the number of WMs necessary to provide coverage of these events that the public expects, using a series of television broadcast channels. Event frequency coordinators are required at these events to make sure that the most efficient use is made of the limited amount of spectrum available now for WMs in real time. Should anything less than the current amount of WM spectrum be available in the near term, given the equipment now in the field, the public will be deprived of the ability to have these events brought to them as they are now.

Commission has not limited the reserved channels in a given market to only licensed WMs, not all of the two reserved channels can be used in any given market. Sharing between licensed and unlicensed WMs is complicated because users of unlicensed WMs typically do not participate in local coordination efforts. Notwithstanding, the Commission in September of 2010 refused to provide any additional spectrum for WMs, saying that:

We disagree with those who argue that more spectrum should be reserved for wireless microphones. We observe that wireless microphones generally have operated very inefficiently, perhaps in part due to the luxury of having access to a wealth of spectrum. While there may be users that believe they need access to more spectrum to accommodate more wireless microphones, we find that any such needs must be accommodated through improvements in spectrum efficiency.

It is true that, because of the need for broadcast-quality audio for broadcast applications, and for use of WMs in theatrical productions, WMs have historically required almost 200 kilohertz of occupied bandwidth. While the next generations of WMs may have narrower bandwidths, this equipment is not now universally available. Manufacturers of WMs have a very substantial investment in research and development in the current generation of WMs. Broadcast licensees (and churches and theaters, etc.) have a substantial investment in purchased equipment with a very long usable life. There is a large base of embedded equipment which has very recently been acquired by broadcasters in reliance on the continuation of the availability of the accommodations created in the White Spaces Docket and most especially the two reserved channels.

7. In addition to the reserved TV channels (which vary by market) for general daily operation, the Commission created the very new geolocation database registration arrangement for operations that exceed the spectrum available through the two reserved channels. WM users, licensed and unlicensed, are just now able to make use of these databases to ensure that their WM use can continue without interference from TVBDs. The Public Notice announcing final

implementation of the database was released as late as March 26, 2012,¹⁸ and the Notice regarding special, complex procedural rules for use by unlicensed parties was released on September 19, 2012, about four months ago. It was not until December 6, 2012, just over a month ago, that the registration system for unlicensed WMs was made available on a nationwide basis. Only now are major event/production venues across the country able to register with the TV bands white space database systems so that operations of unlicensed WMs and LPAS devices at specified times will be protected from potential interference caused by TVBDs.

8. A large number of WM users are unlicensed. They are non-technical users and have no idea of the complexity of the arrangements made in 2010 for their continued use of WMs going forward. Historically, in SBE's experience (through its frequency coordination program) unlicensed WM users (due to a lack of familiarity with their regulatory obligations or entitlements in the use of WMs) have a very high learning curve and a very low level of compliance with respect to the Commission's rules. It will take a long time to change established operating patterns.

9. The Public Notice *and Incentive Auctions NPRM* propose a radical change of direction for WM and LPAS operations. Broadcasters, video production companies, manufacturers and representatives of unlicensed WM users have had very little time to accommodate the Commission's most recent changes stemming from the White Spaces proceeding. Any further erosion of the availability of spectrum for WM and LPAS operation will severely limit, if not preclude, real-time ENG and news, sports and entertainment programming. The Commission's zeal to auction the television broadcast bands must be tempered by the reality that WM technology is deeply embedded in the TV broadcast bands now and for the foreseeable future.

¹⁸ FCC Public Notice, *Office of Engineering and Technology Announces the Approval of Telcordia Technologies, Inc.'s TV Bands Database System for Operation*, DA 12-466 (rel. Mar. 26, 2012).

The issues raised in the Public Notice are less significant than the very radical (and, SBE would respectfully submit, unworkable) proposals for WMs in the *Incentive Auctions NPRM*. In effect, there is no proposal in that proceeding for accommodating wireless microphone operations in the context of an overall reduction of available UHF spectrum for unlicensed use.¹⁹

III. The Commission Should Ensure That The Reconfigured UHF Television Broadcast Band Has At Least 24 MHz per Market Available for WM Operation.

10. The *Incentive Auctions NPRM* represents a sharp departure from the TV White Spaces Docket in terms of accommodation of WMs and LPAS devices in the UHF television band. The Commission stated at paragraph 224 of that NPRM:

The repacking of television stations may result in a reduced amount of spectrum being available in the core television bands for use on a secondary basis by licensed wireless microphones under the LPAS rules and for use by unlicensed wireless microphone operations. At the same time...with the proposed creation of guard bands for new uses some spectrum may be newly available for unlicensed use, including wireless microphones that can use the technologies required for white space device operations in the guard bands. We seek comment on what steps we should take, if any, to best accommodate wireless microphone operations along with other uses, as well as to ensure that the available spectrum is used efficiently and effectively by wireless microphones. We seek comment with respect to both licensed LPAS and unlicensed operations.

In short, the NPRM constitutes, to a great extent, a proposed abandonment of the accommodations made in 2010 for WMs and LPAS devices. Notably absent from any of the proposals in the NPRM is any accommodation specifically for *licensed* WMs. The NPRM proposes to scrap the two reserved channels for WMs near Channel 37. Depending on the outcome of the incentive auction, there may be no channels available for WM operation in a given market which are not shared with TVBDs, and no channels where unlicensed (and

¹⁹ *Incentive Auctions NPRM*, ¶ 224. Nor is VHF spectrum a viable substitute for UHF WM operation. The Commission has acknowledged that there is very little professional quality equipment available for use in TV channels 2-13.

therefore uncoordinated) WMs would be excluded.²⁰ The Commission makes no proposal for any reaccommodation spectrum for any WMs elsewhere, having noted earlier that there is generally no replacement spectrum offered for displaced secondary users in reallocated spectrum. It does, however, ask at ¶ 225 what can be done to promote more “efficient or effective” operation of WMs in this spectrum:

In particular, we seek comment on the operations of wireless microphones in the repacked spectrum that continues to be used for broadcast television service. With less broadcast television spectrum available after the repacking, and the possibility that two channels may no longer be designated for wireless microphone use, are there additional steps that we should take to promote more efficient or effective operations of wireless microphones in this spectrum? For instance, to make more of this limited spectrum usable for wireless microphones, should the Commission revise the rules for operating these devices on a co-channel basis with television stations in the UHF band by reducing the separation distance of 113 kilometers, a requirement established prior to the transition to digital television?²¹ Apart from reducing the separation distances generally, are there other, more precise methods that we should consider, such as permitting co-channel wireless microphone use even closer to television stations through use of a database that takes into account the particular interference conditions at that location?

SBE’s view is that a minimum of 24 MHz of spectrum should be available for WMs in each market. This number could be reduced over time, as narrowband WM technology evolves, but despite the fact that a few manufacturers may have narrower bandwidth WMs available now, it would be completely unreasonable for the Commission to mandate a short-term narrowband conversion of WM technology. The Commission has, in the radical changes proposed now, and in proposing to abandon the minimal accommodations adopted in the 2010 White Spaces

²⁰ As discussed *infra* in Paragraph 11, the guard bands, without more, would offer no solace for licensed WM users, and especially broadcasters due to the co-channel sharing with TVBDs and a concentration of unlicensed WMs.

²¹ 47 C.F.R. § 74.802(b). In this regard, we note that productions using these low power devices often take place indoors, where the attenuation by the building structure could make it less likely that there will be interference with TV reception. In addition, we note that our rules only require that personal portable white space devices to adhere to a minimum separation distance of 6 kilometers from co-channel TV broadcast contours. See 47 C.F.R. § 15.712-(a)(2).

proceeding, created in effect a “bait and switch” situation in less than two years. Broadcasters and video production companies have very recently invested heavily in current generation equipment in reliance on the availability of the two reserved channels. If there are no channels available for TVBDs, WMs and LPAS devices after the incentive auctions, the database registry for WM venues to be protected from TVBDs is of course moot. Furthermore, if there are no channels reserved for WMs and LPAS devices which are not to be shared with TVBDs, WM users, and especially licensed broadcasters and video production entities simply cannot provide interference-free service to the viewers that expect the same and receive it now.

11. The only proposal in the NPRM that would offer any accommodation at all for WMs is apparently to allow WMs, LPAS devices and TVBDs to operate in the two guard bands (Channel 37 and the lower adjacent of the lower uplink/downlink wireless segments to be auctioned). This is a seriously inadequate and insufficient accommodation for WM operation. From the perspective of television broadcasters, it offers them no ability at all to cover breaking news events in real time. *It is critical for broadcasters that there be at least two reserved channels, totaling at least 12 MHz, exclusively for WM operation.* What happens at a breaking news event is that multiple broadcast entities converge on the same geographic area. Some are local, some are not. Each entity requires at the very least two WM channels (one for the WM and one for the IFB). One broadcast entity may have several reporters on site, necessitating several channels. Shared guard bands would not provide the opportunity to cover these events.

12. At the same time, there is a need for the foreseeable future to have available for video production of news, sports and entertainment events -- regardless of the means of multicasting those events to the viewing public -- at least a total of 24 MHz of spectrum available. This would

provide a total of 120 channels²² for WM operation, albeit only 12 of which would be on reserved channels on which TVBDs would be excluded, but provided that the registration database is available on a nationwide basis, the spectrum would be available to accommodate major news, sports and entertainment broadcasting as it is being done now. In order to aggregate 24 MHz of spectrum for WMs in each market, SBE suggests that the Commission preserve the concept of two channels near Channel 37 (unless the Commission relocates whatever Radioastronomy is still ongoing in the 608-614 MHz band, in which case Channel 37 could be one of the two reserved channels in each market) and as well permit WM operation in each of the two proposed “guard bands” provided that those guard bands are at least six megahertz wide each.

13. As noted above, *over time*, it would be reasonable to pare down this 24 MHz of spectrum for WMs in each market to something less, due to changed technology. SBE begs to differ with the Commission’s claim, however, that WM operation is presently “inefficient”. The bandwidths used in the current generation of WMs, wireless intercoms and LPAS devices have been necessary for transmission of broadcast quality audio. Theater and church use of WMs has necessitated high quality audio. It will be at least fifteen if not twenty years before the current generation of WM equipment is retired and universally replaced by a next generation of equipment. Taking a cue from the Land Mobile Radio Service, which is in the midst of a two-part narrowbanding conversion in the VHF and UHF land mobile radio bands from 25 kHz technology to 12.5 kHz and, later, 6.25 kHz technology, it is necessary to plan for and to allow a reasonable transition to more narrowband WM technology over a period of years. Also as noted above, broadcasters, in reliance on the Commission’s adopted plan for the availability of the two

²² Not all of those channels could be used at once in any given venue due to adjacent-channel interference; the number of usable channels in a 24 MHz band or bands would likely be more on the order of 60 with current technology.

reserved channels for WMs in each market, have made large expenditures for equipment that will function adequately. The Commission cannot simply note that one or two manufacturers have on the market narrow bandwidth equipment and, based on no more than that, adopt a band plan that will render unusable an entire generation of equipment, including other manufacturers' product lines and recently-purchased equipment held by broadcasters and other WM users, which is in daily, regular use.

IV. Eligibility for Part 74 Licensing.

14. The Public Notice asks about the possibility of expanding eligibility for Low Power Auxiliary licensing to include entities other than broadcast, cablecast, and motion picture and video production entities. There is not a great deal of need shown for expansion of eligibility for Part 74 licensing, but in SBE's view there are some benefits in certain contexts to expanding licensing eligibility. Under current rules, unlicensed WMs are allowed to operate in the television broadcast band at slightly lower power levels than, and on a secondary basis to, licensed WM users. As discussed above, unlicensed WM users are non-technical entities typically. Also typically, they utilize higher-powered WMs intended for licensed users. The Commission's database registration system permits large venues to register their locations so as to permit licensed and unlicensed WMs to be protected against interference from TVBDs. Even in these venues, unlicensed WMs must protect licensed WM operation. It is apparent in any case that the Commission does intend to protect unlicensed WM operation by churches and theaters and that there is a place for unlicensed WMs in some venues.

15. Given the above, it is SBE's view that expanding part 74 Low Power Auxiliary Service license eligibility to include certain large venues would be beneficial. Sports arenas, large churches, large theaters, and major auditoriums, if licensed, would be relieved of the

obligation to file for periodic temporary operation and going through a 30-day waiting period. As licensees, they would also be obligated to utilize SBE's available frequency coordination process so as to conduct the most efficient shared operation with other licensed users. The most difficult part of the Commission's current Part 15 and Part 74 shared spectrum paradigm for WMs is that the Part 15 WM users do not as a practical matter participate in SBE's well-established, voluntary frequency coordination program. Because there is among licensed WM users a much higher level of participation in frequency coordination, it makes some sense to allow licensing of major event venues under Part 74 LPAS rules. This would create problems for broadcasters attempting to cover breaking news events, however. During breaking news event coverage and normal ENG, broadcasters cannot as a practical matter tolerate equal priority of access to spectrum with event venues. This could be addressed to some extent in the frequency coordination process, but the Commission should make clear that ENG activities will have priority in terms of access to limited WM spectrum during news events, if licensing of event venues is permitted.

16. The Public Notice asks whether or not nuclear power generating facilities should be permitted to be licensed to use wireless intercoms (which are in effect wireless microphones and operate in the same spectrum). The Commission has for years permitted nuclear power facilities to utilize these intercoms by temporary waiver and pursuant to experimental licenses. Since 2003, and by agreement among the National Association of Broadcasters, SBE, the former Association for Maximum Service Television, the Nuclear Energy Institute and the Utilities Telecom Council, cooperative arrangements have been made for nuclear power plants to use wireless intercom equipment for communication among personnel for various purposes, including during refueling, during plant "outages" and in other circumstances. The wireless intercom

equipment is presently the only equipment known to offer the requisite features and capabilities to allow plant workers to efficiently communicate and fulfill their obligations under the Nuclear Energy Commission's ("NRC") "ALARA" standard. The ALARA standard requires NRC licensees to make every reasonable effort to maintain exposures to radiation as far below the NRC-established dose limits as is practical, consistent with the purpose for which the licensed activity is undertaken, taking into account the state of technology, the economics of improvements in relation to the benefits to the public health and safety, and other societal and socioeconomic considerations, in relation to the utilization of nuclear energy and licensed materials in the public interest. See, 10 C.F.R. § 20.1003 et seq. Although the equipment transmits on Part 74 frequencies for which the facilities are not eligible users, since 2003 the Commission has issued a series of Special Temporary Authorizations ("STAs") to permit the facilities' continued use of the equipment on Part 74 frequencies in order to accommodate the nuclear industry's efforts to limit plant worker exposure to radiation.

17. SBE acknowledges the facilities' needs for reliable telecommunications. The facilities have agreed to and do engage in local frequency coordination, and there have been no complaints of actual interference noted over a period of many years. The above-referenced entities forged in 2007 a consensus plan that was based on the Commission's granting experimental licenses to each of the NRC-licensed nuclear plants. The use of wireless intercom equipment is on a secondary basis to all Part 73 and 74 broadcast licensees. The plants use the equipment inside all plant buildings at maximum power levels of 125 mW effective radiated power. They are used outdoors during refueling operations outdoors, during outages, or in any potentially hazardous circumstances such as during radiological material handling.

18. Given this cooperative history, the absence of interference complaints, and the

compelling need shown for use of this equipment by nuclear power generating facilities, SBE urges that nuclear power facilities be considered eligible for LPAS licenses, again on a secondary basis to ENG operations by broadcasters and with the requirement that all operation be subject to prior frequency coordination as has been the case all along.

V. More Efficient Wireless Microphone Operation Through Technical Advancements.

19. As broadly discussed above, while digital wireless microphone technology may allow for more efficient operation in terms of occupied bandwidth, this technology is still new and has yet to be significantly embraced for a number of reasons. There can be tradeoffs in terms of latency and graceful failure as opposed to analog WM devices. Many broadcasters have made very recent, very significant investments in analog microphones to accommodate the clearing of the 700 MHz band, as required by the Commission. It will be quite a few years until this equipment is depreciated and/or subject to replacement. Doubtless, during this period, manufacturers will gradually convert to digital technology and so will the WM consumers, and digital narrowband equipment will become more universally available without the current tradeoffs. In the meantime, over at least the next fifteen years, the transition will have to be permitted on a gradual, rather than a “flashcut” basis.

VI. Conclusions.

20. The Commission has placed broadcasters, manufacturers, and other users of licensed and unlicensed WM, wireless intercom and LPAS devices in a very difficult position following the clearing of the 700 MHz band and the 2010 accommodations made for TVBDs in the UHF television band. Having just now started to adjust to this process, and having made very substantial investments in UHF wireless microphone equipment and R&D for the same, these same entities are being asked why the very few provisions made for continued use of WMs in the

band between 512 MHz and 698 MHz should not be scrapped entirely, and replaced with a very uncertain RF environment that may or may not accommodate them at all, post-incentive auction. The Commission should not retreat from the provisions made in 2010 for continued ENG and news coverage operations by broadcasters; and for broadcast and cablecast of major news, sports and entertainment events in real time. While over a period of several years, the Commission may provide for a more spectrum efficient technology migration process for licensed and unlicensed WMs, this cannot be done on any short term basis. SBE suggests that a period of fifteen years might be appropriate for the process. In the interim, it will be necessary to provide an assured minimum of 24 MHz of spectrum in each market that will be available for licensed and unlicensed WMs. Of this 12 MHz must be exclusive and not subject to TVBD operation. The remainder can be in guard bands or wherever the Commission finds suitable.

21. In terms of eligibility for licensing, SBE has no objection to expanding Part 74 Low-Power Broadcast Auxiliary Service eligibility to include major event venues such as large churches, large theaters, sports arenas, race tracks and concert halls, as well as nuclear power generating facilities. The licensing process will have the benefit of providing a basis for frequency coordination where none exists now relative to unlicensed WM users. However, the licensing process for these new eligibles should be premised on protection of broadcast ENG operations under any circumstances.

Accordingly, for good cause shown, SBE urges the Commission to take action in the

Incentive Auction Proceeding and in the Wireless Microphone docket only in accordance with these comments and not otherwise.

Respectfully submitted,

**THE SOCIETY OF BROADCAST ENGINEERS,
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